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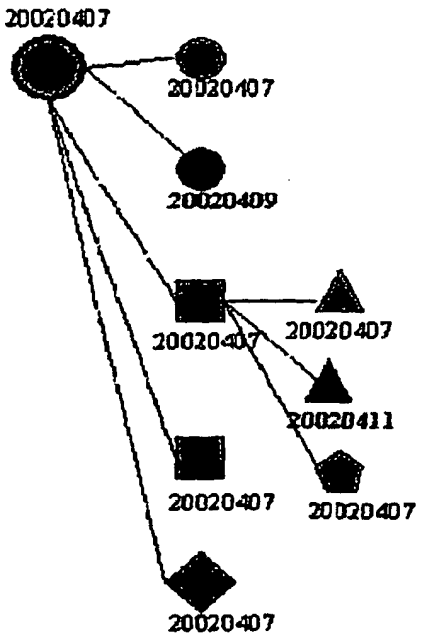
(54) Title: ELECTRONIC DOCUMENT VERSIONING METHOD AND UPDATED DOCUMENT SUPPLY METHOD USING VERSION NUMBER BASED ON XML



(57) Abstract: ABSTRACT OF THE DISCLOSURE Methods and apparatus for versioning an electronic document based on XML and methods and apparatus for providing an updated electronic document based on XML can use a version value. The electronic document being managed can use a syntax defining a structure of the structured electronic document. One method is characterized in that date information of when a content of the electronic document is changed is used as a version value.

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ELECTRONIC DOCUMENT VERSIONING METHOD AND UPDATED DOCUMENT SUPPLY METHOD USING VERSION NUMBER BASED ON XML

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an electronic document request/supply method, and more particularly, to an XML-based electronic document request/supply method.

2. Background of the Related Art

In recent years, an extensible markup language (hereinafter, referred to as "XML") is widely used to create electronic documents. The utilization of XML increases rapidly throughout the world, and government and public offices as well as general enterprises are increasingly introducing the XML. These electronic documents are generally created on the basis of a syntax prescribed by each organization.

XML-based electronic documents are often managed in a client/server structure that stores the documents in the server and provides desired electronic documents according to the user's request. Such a client/server structure is illustrated in FIG. 1.

FIG. 1 is a schematic view of the client/server structure that requests/supplies a general XML-based electronic document. As shown in FIG. 1, the client is a document requester/user side and the server is a document provider side. Accordingly,

if a system requesting and using a document has functions of storing and providing the document at the same time, the system can simultaneously act as the client and the server according to its role.

A language for searching XML documents includes XML query language (XQL) and XQuery. These search languages are widely used to search XML documents stored in an electronic document repository of the server and accept/provide a result in a form of XML document desired by the requester.

However, the related art XML electronic document request/supply methods and apparatus have various disadvantages. In a related art system that provides a document in accordance with a user's request, there does not exist a separate expression method for notifying only of the modified or added content of a document. Hence, in order to provide information on the modified or added content of the document, the related art system has a drawback in that it has to send the overall content of the document containing the repeated content (e.g., unchanged) which was initially sent.

The above references are incorporated by reference herein where appropriate for appropriate teachings of additional or alternative details, features and/or technical background.

SUMMARY OF THE INVENTION

An object of the invention is to solve at least the above problems and/or disadvantages and to provide at least the advantages described hereinafter.

Another object of the present invention is to provide an electronic document versioning method and/or document update transmission method based on XML using version numbers that substantially obviates one or more problems caused by limitations and disadvantages of the related art.

Another object of the present invention to provide an electronic document versioning method that enhances transmission efficiency of an electronic document transmission method on XML.

Another object of the present invention to provide an electronic document versioning method that is capable of gradual updating of an electronic document transmitted using XML.

Another object of the present invention to provide an electronic document versioning method in which at least one of date information and date with time information of a modified structure of the structured electronic document are used as version values.

Another object of the present invention is to provide an electronic document versioning method that is capable of changing a version value of a lower structure when the content of the lower structure is changed by correction or addition and capable of reflecting where such changes in a version value of a corresponding upper structure that includes the changed lower structure.

Another object of the present invention is to provide an electronic document versioning method that is capable of changing a version value of an upper structure so

that the version value of the upper structure can determine the one or more corresponding lower structures that have changed.

Another object of the present invention is to provide an updated document supply method based on XML in which a provider sends not the overall content of the document but only the added or changed content by using a version value.

Another object of the present invention is to provide a document supply method based on XML in which identifier information on the electronic document can be used together with version values to distinguish the electronic document using the version values when the identifier information value is used again.

To achieve at least the above objects and other advantages in a whole or in part and in accordance with the purpose of the invention, as embodied and broadly described herein, there is provided a method for versioning an electronic document based on XML, the electronic document being managed using a syntax defining a structure of the structured electronic document, the method includes identifying a structure of an electronic document, and using date information of when a structure content of the electronic document is changed as a version value.

To further achieve the above objects and advantages in a whole or in part and in accordance with the present invention, there is provided a method for versioning an electronic document based on XML, the electronic document being managed using a syntax defining a structure of the structured electronic document, the method includes determining contents of an electronic document defined by the syntax, and using date

and time information of when a content of the electronic document is changed as a version value.

To further achieve the above objects and advantages in a whole or in part and in accordance with the present invention, there is provided a method for requesting an electronic document based on XML, the electronic document being managed using a syntax defining a structure of the structured electronic document, the method includes identifying a version value of an electronic document, and requesting an updated information of the electronic document using the version value as a condition.

To further achieve the above objects and advantages in a whole or in part and in accordance with the present invention, there is provided a method for providing an updated electronic document based on XML, the electronic document being managed using a syntax defining a structure of the structured electronic document, the method includes identifying a version value of an electronic document, wherein the version value determines at least one of date and time information of a changed content of the electronic document, and providing an updated information of the electronic document using the version value as a condition.

To further achieve the above objects and advantages in a whole or in part and in accordance with the present invention, there is provided a method for processing an electronic document using a version based on XML, the electronic document being managed using a syntax defining a structure of the structured electronic document, the method includes providing an identifier for an electronic document, and providing a version value for the electronic document in which at least one of date information and

date with time information of when a content of the electronic document is changed are used as the version value of the corresponding electronic document, wherein the version value is used to distinguish two electronic documents having the same identifier.

Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objects and advantages of the invention may be realized and attained as particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in detail with reference to the following drawings in which like reference numerals refer to like elements wherein:

FIG. 1 is a schematic view of a related art client/server structure that requests/supplies an XML-based electronic document;

FIG. 2 is a diagram schematically showing an exemplary method of creating an XML-based electronic document;

FIG. 3 is a diagram schematically showing a preferred embodiment of a method for versioning an XML-based electronic document according to the present invention;

FIG. 4 is a diagram schematically showing another preferred embodiment of a method for versioning an XML-based electronic document according to the present invention;

FIG. 5 is a diagram schematically showing yet another preferred embodiment of a method for versioning an XML-based electronic document according to the present invention;

FIG. 6 is a diagram showing an exemplary syntax structure of a broadcast program produced by an XML-based electronic document creating method to which an electronic document versioning method according to the present invention is applied;

FIG. 7 is a diagram of an exemplary DTD showing a syntax of a broadcast program produced by an XML-based electronic document creating method to which an electronic document versioning method according to the present invention is applied;

FIG. 8 is a diagram of an exemplary XML schema showing a syntax of a broadcast program electronic document produced by an XML-based electronic document creating method to which an electronic document versioning method according to the present invention is applied;

FIG. 9 is a diagram of an exemplary broadcast program electronic document produced by an XML-based electronic document creating method to which an electronic document versioning method according to the present invention is applied;

FIG. 10 is a diagram showing an exemplary current state program electronic document using a preferred embodiment of a method for versioning an XML-based electronic document according to the present invention;

FIG. 11 is a diagram showing an exemplary current state program electronic document using another preferred embodiment of a method for versioning an XML-based electronic document according to the present invention;

FIG. 12 is a diagram showing an exemplary current state program electronic document using yet another method for versioning an XML-based electronic document according to the present invention;

FIG. 13 is a diagram showing an exemplary updated electronic document provided according to 'request 1' in a system a using a preferred embodiment of a method for versioning an XML-based electronic document according to the present invention;

FIG. 14 is a diagram showing an exemplary updated electronic document provided according to 'request 1' in a system using additional preferred embodiments of methods for versioning an XML-based electronic document according to the present invention;

FIG. 15 is a diagram showing an exemplary updated electronic document provided according to 'request 2' in a system using a preferred embodiment of a method for versioning an XML-based electronic document according to the present invention;

FIG. 16 is a diagram showing an exemplary updated electronic document provided according to 'request 2' in a system using additional preferred embodiments of methods for versioning an XML-based electronic document according to the present invention;

FIG. 17 is a diagram showing an exemplary updated electronic document provided according to 'request 2' with an identifier and a system using a preferred embodiment of a method for versioning an XML-based electronic document according to the present invention; and

FIG. 18 is a diagram showing an exemplary updated electronic document provided according to 'request 2' with a system using an identifier and additional preferred embodiments of methods for versioning an XML-based electronic document according to the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Embodiments of an electronic document versioning method and embodiments of a document supply method using a version number based on an XML according to the present invention will now be described. XML-based electronic documents can define syntaxes using a document type definition (DTD) or an XML schema language. These syntaxes define a structure of an entire electronic document and restrict name and occurrence frequency of each element, order, whether it is an essential element or an optional element, attribute of each element, etc. The electronic documents become valid documents with respect to the syntaxes created by these languages. According to embodiments of the present invention, versions assigned to the electronic document can correspond to the element, attribute or the like.

Embodiments of the present invention disclose methods and apparatus whereby a provider can manage updated information of document depending on time

using a prescribed version, element/attribute value of the syntax. Also according to embodiments of the present invention, a requester can request documents after a prescribed version value of a selected document provided to the requester from a repository. The requester intends to be supplied with the electronic documents after the version value so that the prescribed version value is used as a condition.

Further, an identifier of an electronic document is re-used later or after a certain time period. Embodiments according to the present invention can provide a way to identify a previous document having the identifier from a new or updated document.

Identifier information can be the only identification information capable of identifying a specific document. However, the range of the identifier information is limited. Accordingly, the identifier information is preferably orderly used from a first or minimum value. The life span of the allotted identifier value becomes a period in which all values in the identifier range (e.g., to the last or maximum value) are used.

In a case where the number of electronic documents is increased and thus the identifier information is used to the maximum value of its range, circulation is again repeated (e.g., continued re-using the identifier information) using the identifier information allotted to an invalid electronic document. In other words, an identifier value that is no longer valid as it reaches the identifier circulation period, can be again used in a new document.

Thus, there is a need of discrimination between an old document and a new document having the same identifier value for reasons such as document management and the like. It is possible to discriminate two such documents by the version value, for

example using the latest correction date and time information, according to embodiments of the invention. That is, the two documents can be discriminated by using the latest correction date/time together.

Embodiments of XML-based electronic document request/supply method can be applied, for example, to systems including a requester who requests to be provided an electronic document, a provider that provides the requested electronic document, and a network coupled between the requester and the provider. Also, methods can be applied to a system that provides only a part of a basic information in an environment such as a broadcast program supply system, and then supplies updated information according to user's necessity or request.

Three methods for versioning an electronic document based on XML will now be described. However, the present invention is not intended to be so limited. FIG. 2 is a diagram schematically showing a general method of creating the XML-based electronic document. As shown in FIG. 2, each parenthesis is indicative of a number of lower structures that can be transited to upper structure. In order to consider all possible cases, it is assumed that zero (0) to infinity structures are respectively possible.

A first embodiment of a method for versioning the electronic document based on XML according to the present invention uses date information at which content of document is added or corrected as a version value. Further, a value including the date with time information can be used as the version value, however, only the date information would be sufficient for the version value. FIG. 3 is a diagram showing the

first embodiment of a method for versioning the XML-based electronic document used in FIG. 2 according to the present invention.

A second embodiment of a method for versioning the electronic document based on XML according to the present invention, when a version value of lower structure is corrected, a version value of an upper structure is changed to the latest information (e.g., most recently changed) among the version values of corresponding lower structures. In the second embodiment of a method, the version value can be similar to the first embodiment of a method for versioning the electronic document based on XML. FIG. 4 is a diagram schematically showing the second embodiment of a method for versioning the XML-based electronic document of FIG. 2 according to the present invention. As shown in FIG. 4, the latest value among the version values of the lower structure becomes the version value of the upper structure.

According to a third embodiment of a method for versioning the electronic document based on XML according to the present invention, a version value of an upper structure indicates which (e.g., or whether an arbitrary type) lower structure is corrected or added. According to the third versioning method, if there are multiple lower structures, changed type can be easily or directly retrieved using version values to thereby decrease the retrieval time. In the third embodiment of a method, a version value can be similar to the second embodiment of a method for versioning the electronic document based on XML. FIG. 5 is a diagram schematically showing a third embodiment of a method for versioning the XML-based electronic document of FIG. 2 according to the present invention.

For example, as shown in FIG. 5, a lower structure type can be expressed by a bit masking method using a bit masking value such as decimal or hexadecimal. However, the present invention is not intended to be so limited as other version values instead of bit masking values and others can be used that are sufficient to supplement the basic information such as the date information or date with time information with an identification of the possible corresponding lower structure types. Further, the provider can use the bit masking according to the third embodiment of a method for the purpose of inner management, and can provide a value except for the bit masking information as a version value when the provider provides a requester with a document or a requested document update.

As one example application, the syntax of electronic document regarding a broadcast program is defined as follows, and application cases of an electronic document versioning method and an electronic document updating method based on XML will now be described. FIG. 6 is a diagram showing an exemplary syntax structure of a broadcast program created by the XML-based electronic document creating method to which embodiments of the electronic document versioning method according to the present invention is applied.

Broadcast programs can have information such as 'version', ' broadcast contents' and 'broadcast schedules'. It is assumed that 'Broadcast contents' have a list on 'version' and 'broadcast content', and 'broadcast content' has information on program contents such as 'version', 'title', a sole 'program identifier' indicating program, synopsis and the like. In addition, it is assumed that 'broadcast schedules' have a list on

'version' and 'broadcast schedule', and 'broadcast schedule' has broadcast-related information such as 'version', a sole 'program identifier' indicating program, 'broadcast company', 'broadcast time', 'broadcast duration' and the like. Schema of these syntaxes is shown in FIG. 6.

Exemplary broadcast program syntaxes can be created as shown in FIGs. 7 and 8. FIG. 7 is a diagram showing an exemplary DTD showing the syntax of the broadcast program created by an XML-based electronic document creating method to which the electronic document versioning method according to embodiments of the present invention is applied, and FIG. 8 is a diagram showing an exemplary XML schema showing the syntax of a broadcast program electronic document produced by the XML-based electronic document creating method to which the electronic document versioning method according to embodiments of the present invention is applied.

The version value may use a type of 'dateTime' because it uses date information. However, the version value can be defined in a type of 'string', 'integer', 'float' and the like according to the versioning and the application supplied, and then can be type-converted into other types for use. In FIG. 8, the type of 'string' is used for the three electronic document versioning methods according embodiments of the present invention.

FIGs. 9, 10, 11 and 12 show the broadcast program documents substantially created depending upon these syntaxes, and show examples of the broadcast program electronic documents created by a XML-based electronic document creating method using the electronic document versioning method according to embodiments of the

present invention. FIG. 9 is a diagram illustrating an exemplary initial document structure. FIGs. 10, 11 and 12 are diagrams illustrating a current state document structure into which the document structure of FIG. 9 is respectively modified using three embodiments of electronic document versioning methods.

It is assumed that, after receiving program information of FIG. 9, the requester requests program information having the modified content up to a current requesting line by using the version value of FIG. 9. In the above circumstance, the requester can request all updated information using the version value ('request 1'), or can request only updated information for a specific structure 'broadcast schedule' ('request 2'). Such request conditions in each case for three embodiments of electronic document versioning methods can be as follows:

'request 1': 'version' $\geq$ 20020407

'request 2': 'broadcast programs/broadcast schedules/broadcast schedule/version' $\geq$ 20020407.

As shown in FIGs. 13, 14, 15 and 16, for 'request 1' and 'request 2', respectively, the electronic document repository can provide the electronic document application system used by the user, with the updated electronic document, according to the prescribed syntax.

For 'request 1', the updated electronic document provided by the first embodiment of the electronic document versioning method is shown in FIG. 13, and the updated electronic document provided by the second and third embodiments of the

electronic document versioning methods is shown in FIG. 14. At this time, since the bit masking (e.g., modified lower structure selector) in the third electronic document versioning method is information that the provider can have internally, the electronic documents provided through the second and third embodiments of electronic document versioning methods can become identical with each other.

Further, for 'request 2', the updated electronic document provided through the first embodiment of electronic document versioning method is shown in FIG. 15. The updated electronic document provided through the second and third embodiments of electronic document versioning methods is shown in FIG. 16.

In a case where two programs coexist at almost same time because of the short life span of the identifier, there is a need for sending information that the previous program is not valid any more. In this case, by providing both of the version value and the identifier value of the invalid document, the requester can discriminate the invalid document having the consistent identifier value from the documents using the previous version values. Accordingly, the requester can use a new document having the identifier value identical with that of the previous document.

For 'request 2', FIGs. 17 and 18 show an example of the document with information on no-longer-valid programs being included in an element <invalid>. FIG. 17 is a diagram illustrating an example of the updated electronic document provided according to 'request 2' in a system using the first embodiment of electronic document versioning method based on XML and identifier according to the present invention. FIG. 18 is a diagram illustrating an example of the updated electronic

document provided according to 'request 2' in a system using the second and third embodiments of electronic document versioning methods and the identifier according to the present invention.

In expressing a previous document having the identifier value 'CNN-2002-0394' of a newly added document to be no longer valid, the previous document is expressed by a version value of '20020110', which corresponds to a earlier (e.g., less) date than the latest modified date of the previous document or an initial creation date of the new document. Accordingly, so that the previous document can be discriminated from the new document having the same identifier value.

Thus, in electronic document versioning methods based on XML and the updated document supply method using the version according to embodiments of the present invention, only updated information among the contents information of the document is supplied, and the updated information is reflected on the documents, for example being used by the requester. Thus, it becomes possible to gradually update the document. Further, in a case where the identifier is reused, the version value based upon the embodiments of versioning methods of the invention can make it possible to discriminate between the new document and the previous document using the same identifier.

As described, embodiments of methods and apparatus for electronic document supply/request and transmission have various advantages. According to embodiments of XML-based electronic document versioning methods, a provider uses date and time information of modified structures as a version value in the provider's management on

the structured electronic document so that the documents can be efficiently managed by using the version value. Further, according to embodiments of XML-based electronic document versioning methods, when the version value of the lower structure is changed by any correction or addition, the changed version value of the lower structure is reflected on the version value of the upper structure. Further, the modified or added lower structure can be retrieved by the version value. Also according to embodiments of electronic document versioning methods and updated document supply method using the version number based on the XML, since the provider separately transmits only contents that should be added or modified, an amount of transmission can be reduced and the requester can update the contents (e.g., only modified contents) of the previous document. In addition, according to embodiments of document supply methods using the version value based on the XML according to the present invention, when the identifier is reused, the new electronic document and the previous document having the same identifier can be discriminated using the version value.

The foregoing embodiments and advantages are merely exemplary and are not to be construed as limiting the present invention. The present teaching can be readily applied to other types of apparatuses. The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art. In the claims, means-plus-function clauses are intended to cover the structures described herein as

performing the recited function and not only structural equivalents but also equivalent structures.

WHAT IS CLAIMED IS:

1. A method for versioning an electronic document based on XML, the electronic document being managed using a syntax defining a structure of the structured electronic document, the method comprising:

identifying a structure of an electronic document; and

using date information of when a structure content of the electronic document is changed as a version value.

2. The method of claim 1, wherein when a lower structure content of the corresponding electronic document is changed, the version value of the lower structure is updated and the updated version value is reflected in a version value of an upper structure.

3. The method of claim 2, wherein a largest value of the version values of the lower structures is used as the version value of the upper structure.

4. The method of claim 3, wherein a type of the updated lower structure is included in the version value of the upper structure.

5. The method of claim 4, wherein the date information includes a time of the structure content change.

6. The method of claim 1, wherein the structure determines an identifier information, and wherein the version value discriminates a desired electronic document when the identifier information is identical for two electronic documents.

7. The method of claim 1, wherein the date information includes a time of the structure content change.

8. A method for versioning an electronic document based on XML, the electronic document being managed using a syntax defining a structure of the structured electronic document, the method comprising:

determining contents of an electronic document defined by the syntax; and

using date and time information of when a content of the electronic document is changed as a version value.

9. The method of claim 8, wherein when a lower structure content of the corresponding electronic document is changed, the version value of the lower structure is updated and the updated version value is reflected in a version value of an upper structure.

10. The method of claim 9, wherein a largest value of the version values of the lower structures is used as the version value of the upper structure.

11. The method of claim 10, wherein a type of the updated lower structure is additively included in the version value of the upper structure.

12. A method for requesting an electronic document based on XML, the electronic document being managed using a syntax defining a structure of the structured electronic document, the method comprising:

identifying a version value of an electronic document; and

requesting an updated information of the electronic document using the version value as a condition.

13. The method of claim 12, wherein a requester requests the updated information of the electronic document having a more recent version value than the version value.

14. The method of claim 12, wherein the requesting the updated information of the electronic document comprises:

selecting a lower structure content of the electronic document; and

requesting the updated information of the selected lower structure having a subsequent version value than the version value.

15. A method for providing an updated electronic document based on XML, the electronic document being managed using a syntax defining a structure of the structured electronic document, the method comprising:

identifying a version value of an electronic document, wherein the version value determines at least one of date and time information of a changed content of the electronic document; and

providing an updated information of the electronic document using the version value as a condition.

16. The method of claim 15, wherein the providing the updated information of the electronic document comprises:

determining a selected content of the electronic document; and

providing the updated information of the selected content having a later version value than the version value.

17. The method of claim 15, wherein when the version value of a requested electronic document identifies a version of the electronic document possessed by the requester, the version value provided by the requester is compared and only the latest updated information of the requested electronic document is provided.

18. The method of claim 17, wherein the provided updated information updates only the corresponding electronic document that can be identified by an identifier.

19. The method of claim 15, wherein when a lower structure content of the electronic document is changed, the version value of the lower structure is updated and included in a version value of an upper structure.

20. The method of claim 19, wherein a largest value of the version values of the lower structures is used as the version value of the upper structure.

21. The method of claim 20, wherein a type of the updated lower structure is additively reflected in the version value of the upper structure.

22. A method for processing an electronic document using a version based on XML, the electronic document being managed using a syntax defining a structure of the structured electronic document, the method comprising:

providing an identifier for an electronic document; and

providing a version value for the electronic document in which at least one of date information and date with time information of when a content of the electronic document is changed are used as the version value of the corresponding electronic document, wherein the version value is used to distinguish two electronic documents having the same identifier.

23. The method of claim 22, wherein when a lower structure content of the corresponding electronic document is changed, the version value of the lower structure is updated and included in a version value of an upper structure.

24. The method of claim 23, wherein a largest value of the version values of the lower structures is used as the version value of the upper structure.

25. The method of claim 23, wherein a type of the updated lower structure is additively reflected in the version value of the upper structure.

Fig.1
Related Art

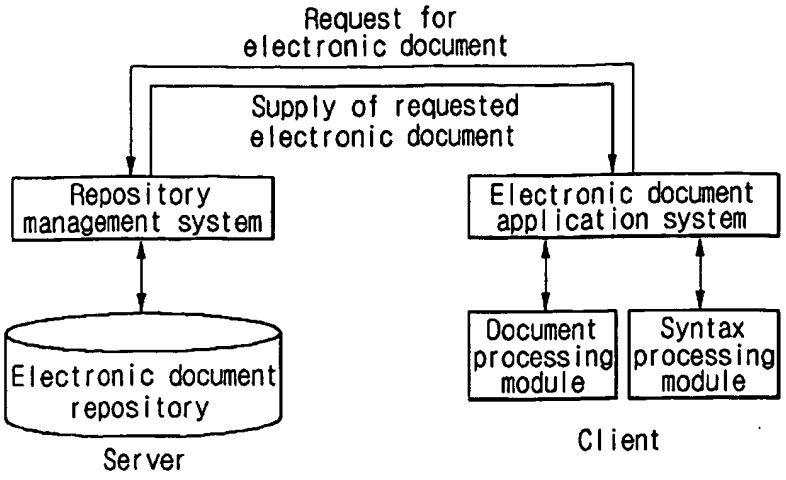


Fig.2
Related Art

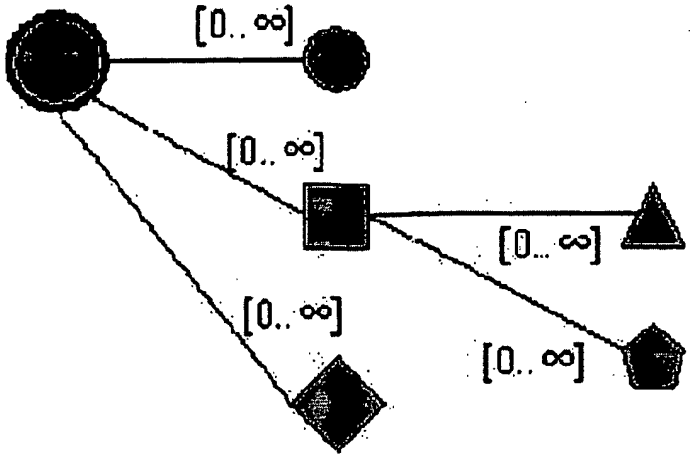
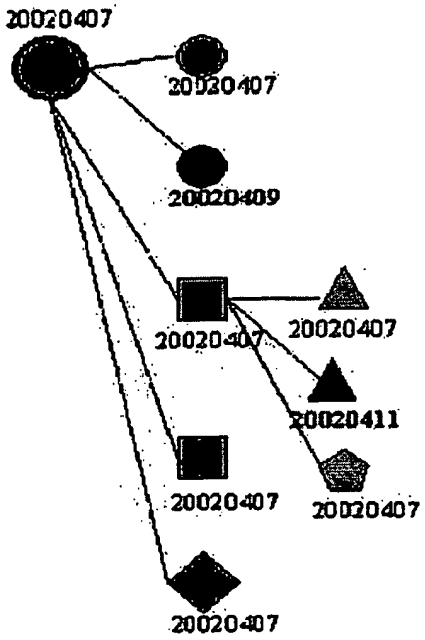


Fig.3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20020407

Fig.4

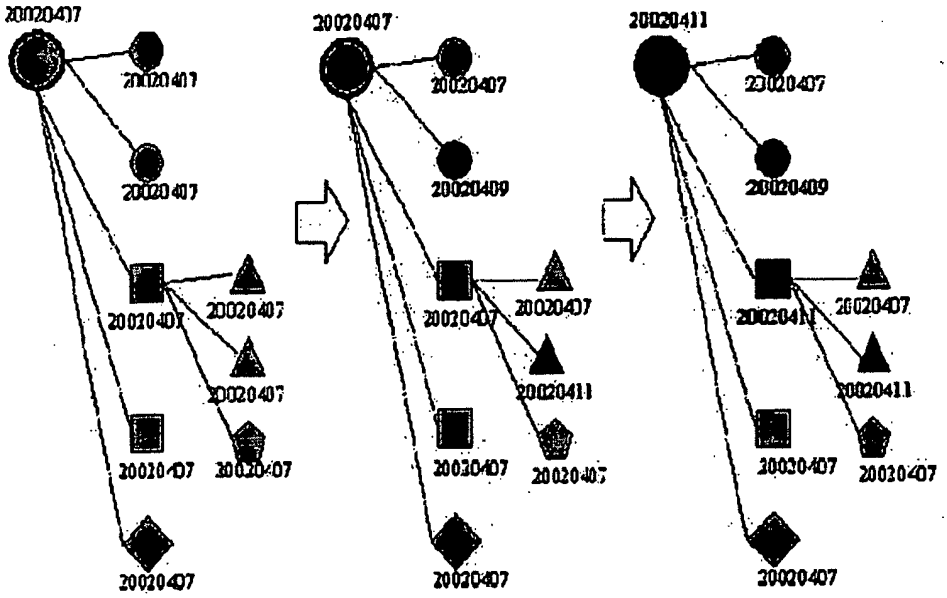
20020407
20020407
20020407
20020407
20020407
20020407
20020407
20020407
20020407
20020407
20020409
20020407
20020407
20020411
20020407
20020407
20020411
20020409
20020411
20020407
20020411
20020407
20020407

Fig.5

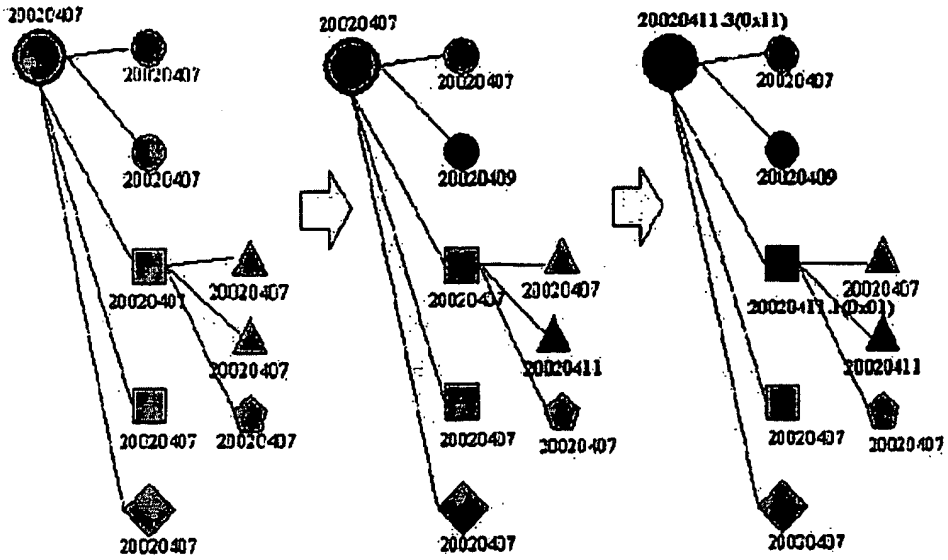
20020407
20020407
20020407
20020407
20020407
20020407
20020407
20020407
20020407
20020409
20020407
20020407
20020411
20020407
20020407
20020411.3(0x11)
20020407
20020409
20020407
20020411.1(0x01)
20020411
20020407
20020407
20020407

Fig.6

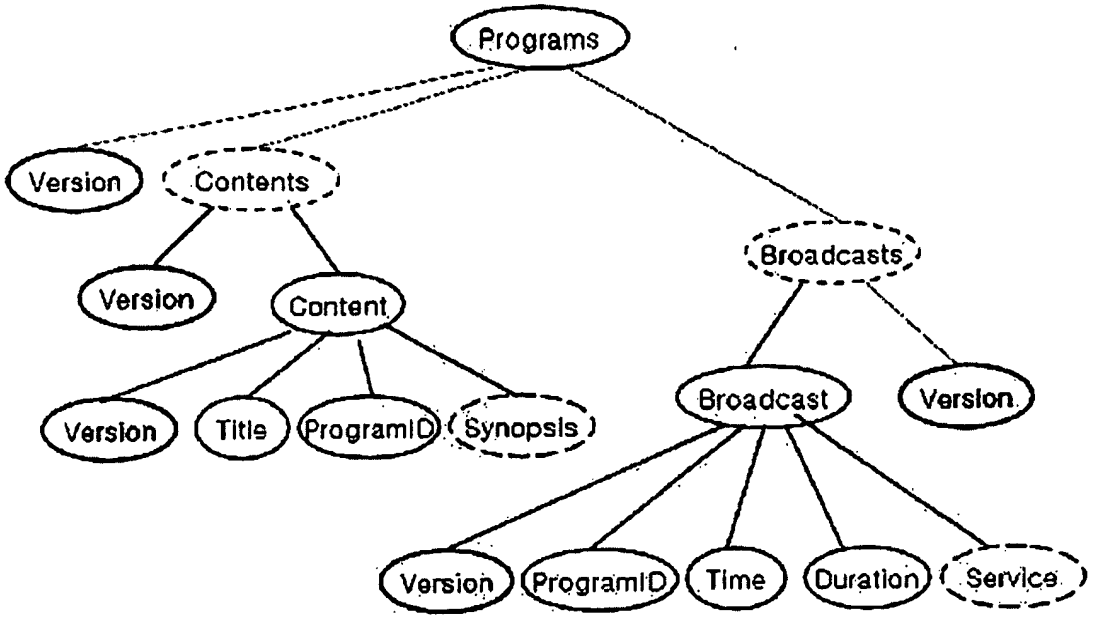
Programs
Version
Contents
Broadcasts
Version
Content
Broadcast
Version
Version
Title
ProgramID
Synopsis
Version
ProgramID
Time
Duration
Service

Fig.7

```
<?xml version="1.0" encoding="UTF-8"?>
<!ELEMENT Programs (Version, Contents?, Broadcasts?)>
<!ELEMENT Contents (Version, Content+)>
<!ELEMENT Content (Version, Title, ProgramID, Synopsis?)>
<!ELEMENT Version (#PCDATA)>
<!ELEMENT Title (#PCDATA)>
<!ELEMENT ProgramID (#PCDATA)>
<!ELEMENT Synopsis (#PCDATA)>
<!ELEMENT Broadcasts (Version, Broadcasts+)>
<!ELEMENT Broadcast (Version, ProgramID, Time, Duration, Service?)>
<!ELEMENT Time (#PCDATA)>
<!ELEMENT Duration (#PCDATA)>
<!ELEMENT Service (#PCDATA)>
```

Fig.8

```
<?xml version="1.0" encoding="UTF-8" ?>
<schema targetNamespace="http://www.sbs.co.kr"
        xmlns="http://www.w3.org/2001/XMLSchema"
        elementFormDefault="unqualified">
  <import namespace="http://www.w3c.org/XML/1998/namespace"
          schemaLocation="./xml-1998.xsd" />
  <element name="Programs">
    <complexType> <sequence>
      <element name="Version" type="string">
      <element name="Contents minOccurs="0">
        <complexType> <sequence>
            <element name="Version" type="string">
            <element name="Content" maxOccurs="unbounded">
              <complexType> <sequence>
                  <element name="Version" type="string">
                  <element name="Title"/>
                  <element name="ProgramID"/>
                  <element name="Synopsis" minOccurs="0">
                </sequence> </complexType> </element>
          </sequence> </complexType> </element>
      <element name="Broadcasts" minOccurs="0">
        <complexType> <sequence>
            <element name="Version" type="string">
            <element name="Broadcast" maxOccurs="unbounded">
              <complexType> <sequence>
                  <element name="Version" type="string">
                  <element name="ProgramID"/>
                  <element name="Time" type="dateTime"/>
                  <element name="Duration" type="dateTime"/>
                  <element name="Service" minOccurs="0"/>
                </sequence> </complexType> </element>
            </sequence> </complexType> </element>
      </sequence> </complexType> </element>
</schema>
```

Fig.9

```
<?xml version="1.0" encoding="UTF-8" ?>
<Programs>
  <Version>20020407</Version>
  <Contents>
    <Version>20020407</Version>
    <Content>
      <Version>20020407</Version> <Title>Friends</Title>
      <ProgramID>KTLA-2002-0324</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title>Will & Grace</Title>
      <ProgramID>KTLA-2002-0391</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title>MAJOR LEAGUE BASEBALL</Title>
      <ProgramID>ESPN-2002-0114</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title> Sesame Street </Title>
      <ProgramID>KCET-2002-0115</ProgramID> </Content>
  </Contents>
  <Broadcasts>
    <Version>20020407</Version>
    <Broadcast>
      <Version>20020407</Version> <ProgramID>KTLA-2002-0324</ProgramID>
      <Time>2002-04-22 21:55</Time> <Duration>110m</Duration>
      <Service>KTLA</Service> </Broadcast>
    <Broadcast>
      <Version>20020407</Version> <ProgramID>KTLA-2002-0391</ProgramID>
      <Time>2002-04-29 21:55</Time> <Duration>70m</Duration>
      <Service>KTLA</Service> </Broadcast>
    <Broadcast>
      <Version>20020407</Version> <ProgramID>ESPN-2002-0114</ProgramID>
      <Time>2002-04-09 15:00</Time> <Duration>120m</Duration>
      <Service>ESPN</Service> </Broadcast>
    <Broadcast>
      <Version>20020407</Version> <ProgramID>KCET-2002-0115</ProgramID>
      <Time>2002-04-09 17:00</Time> <Duration>30m</Duration>
      <Service>KCET</Service> </Broadcast>
  </Broadcasts>
</Programs>
```

Fig.10

```
<?xml version="1.0" encoding="UTF-8" ?>
<Programs>
  <Version>20020407</Version>
  <Contents>
    <Version>20020407</Version>
    <Content>
      <Version>20020407</Version> <Title>Friends</Title>
      <ProgramID>KTLA-2002-0324</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title>Will & Grace</Title>
      <ProgramID>KTLA-2002-0391</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title> MAJOR LEAGUE BASEBALL </Title>
      <ProgramID>ESPN-2002-0114</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title>Sesame Street</Title>
      <ProgramID>KCET-2002-0115</ProgramID> </Content>
    <Content>
      <Version>20020408</Version> <Title>Larry King</Title>
      <ProgramID>CNN-2002-0394</ProgramID> </Content>
  </Contents>
  <Broadcasts>
  <Version>20020407</Version>
    <Broadcast>
      <Version>20020407</Version> <ProgramID>KTLA-2002-0324</ProgramID>
      <Time>2002-04-22 21:55</Time> <Duration>110m</Duration>
      <Service>KTLA</Service> </Broadcast>
    <Broadcast>
      <Version>20020407</Version> <ProgramID>KTLA-2002-0391</ProgramID>
      <Time>2002-04-29 21:55</Time> <Duration>70m</Duration>
      <Service>KTLA</Service> </Broadcast>
    <Broadcast>
      <Version>20020409</Version> <ProgramID>ESPN-2002-0114</ProgramID>
      <Time>2002-04-09 15:00</Time> <Duration>130m</Duration>
      <Service>ESPN</Service> </Broadcast>
    <Broadcast>
      <Version>20020409</Version> <ProgramID>KCET-2002-0115</ProgramID>
      <Time>2002-04-09 17:10</Time> <Duration>30m</Duration>
      <Service>KCET</Service> </Broadcast>
    <Broadcast>
      <Version>20020408</Version> <ProgramID>CNN-2002-0394</ProgramID>
      <Time>2002-04-19 00:55</Time> <Duration>60m</Duration>
      <Service>CNN</Service> </Broadcast>
  </Broadcasts>
</Programs>
```

Fig.11

```
<?xml version="1.0" encoding="UTF-8" ?>
<Programs>
  <Version>20020409</Version>
  <Contents>
    <Version>20020409</Version>
    <Content>
      <Version>20020407</Version> <Title>Friends</Title>
      <ProgramID>KTLA-2002-0324</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title>Will & Grace</Title>
      <ProgramID>KTLA-2002-0391</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title> MAJOR LEAGUE BASEBALL </Title>
      <ProgramID>ESPN-2002-0114</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title>Sesame Street</Title>
      <ProgramID>KCET-2002-0115</ProgramID> </Content>
    <Content>
      <Version>20020408</Version> <Title>Larry King</Title>
      <ProgramID>CNN-2002-0394</ProgramID> </Content>
  </Contents>
  <Broadcasts>
    <Version>20020409</Version>
    <Broadcast>
      <Version>20020407</Version> <ProgramID>KTLA-2002-0324</ProgramID>
      <Time>2002-04-22 21:55</Time> <Duration>110m</Duration>
      <Service>KTLA</Service> </Broadcast>
    <Broadcast>
      <Version>20020407</Version> <ProgramID>LTLA-2002-0391</ProgramID>
      <Time>2002-04-29 21:55</Time> <Duration>70m</Duration>
      <Service>KTLA</Service> </Broadcast>
    <Broadcast>
      <Version>20020409</Version> <ProgramID>ESPN-2002-0114</ProgramID>
      <Time>2002-04-09 15:00</Time> <Duration>130m</Duration>
      <Service>ESPN</Service> </Broadcast>
    <Broadcast>
      <Version>20020409</Version> <ProgramID>KCET-2002-0115</ProgramID>
      <Time>2002-04-09 17:10</Time> <Duration>30m</Duration>
      <Service>KCET</Service> </Broadcast>
    <Broadcast>
      <Version>20020408</Version> <ProgramID>CNN-2002-0394</ProgramID>
      <Time>2002-04-19 00:55</Time> <Duration>60m</Duration>
      <Service>CNN</Service> </Broadcast>
  </Broadcasts>
</Programs>
```

Fig.12

```
<?xml version="1.0" encoding="UTF-8" ?>
<Programs>
  <Version>20020409.3</Version>
  <Contents>
    <Version>20020409.1</Version>
    <Content>
      <Version>20020407</Version> <Title>Friends</Title>
      <ProgramID>KTLA-2002-0324</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title>Will & Grace</Title>
      <ProgramID>KTLA-2002-0391</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title> MAJOR LEAGUE BASEBALL </Title>
      <ProgramID>ESPN-2002-0114</ProgramID> </Content>
    <Content>
      <Version>20020407</Version> <Title>Sesame Street</Title>
      <ProgramID>KCET-2002-0115</ProgramID> </Content>
    <Content>
      <Version>20020408</Version> <Title>Larry King</Title>
      <ProgramID>CNN-2002-0394</ProgramID> </Content>
  </Contents>
  <Broadcasts>
    <Version>20020409.1</Version>
    <Broadcast>
      <Version>20020407</Version> <ProgramID>KTLA-2002-0324</ProgramID>
      <Time>2002-04-22 21:55</Time> <Duration>110m</Duration>
      <Service>KTLA</Service> </Broadcast>
    <Broadcast>
      <Version>20020407</Version> <ProgramID>KTLA-2002-0391</ProgramID>
      <Time>2002-04-29 21:55</Time> <Duration>70m</Duration>
      <Service>KTLA</Service> </Broadcast>
    <Broadcast>
      <Version>20020409</Version> <ProgramID>ESPN-2002-0114</ProgramID>
      <Time>2002-04-09 15:00</Time> <Duration>130m</Duration>
      <Service>ESPN</Service> </Broadcast>
    <Broadcast>
      <Version>20020409</Version> <ProgramID>KCET-2002-0115</ProgramID>
      <Time>2002-04-09 17:10</Time> <Duration>30m</Duration>
      <Service>KCET</Service> </Broadcast>
    <Broadcast>
      <Version>20020408</Version> <ProgramID>CNN-2002-0394</ProgramID>
      <Time>2002-04-19 00:55</Time> <Duration>60m</Duration>
      <Service>CNN</Service> </Broadcast>
  </Broadcasts>
</Programs>
```

Fig.13

```
<?xml version="1.0" encoding="UTF-8" ?>
<Programs>
  <Version>20020407</Version>
  <Contents>
    <Version>20020407</Version>
    <Content>
      <Version>20020408</Version>
      <Title>Larry King</Title>
      <ProgramID>CNN-2002-0394</ProgramID>
    </Content>
  </Contents>
  <Broadcasts>
  <Version>20020407</Version>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>ESPN-2002-0114</ProgramID>
      <Time>2002-04-09 15:00</Time>
      <Duration>130m</Duration>
      <Service>ESPN</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>KCET-2002-0115</ProgramID>
      <Time>2002-04-09 17:10</Time>
      <Duration>30m</Duration>
      <Service>KCET</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020408</Version>
      <ProgramID>CNN-2002-0394</ProgramID>
      <Time>2002-04-19 00:55</Time>
      <Duration>60m</Duration>
      <Service>CNN</Service>
    </Broadcast>
  </Broadcasts>
</Programs>
```

Fig.14

```
<?xml version="1.0" encoding="UTF-8" ?>
<Programs>
  <Version>20020409</Version>
  <Contents>
    <Version>20020409</Version>
    <Content>
      <Version>20020408</Version>
      <Title>Larry King</Title>
      <ProgramID>CNN-2002-0394</ProgramID>
    </Content>
  </Contents>
  <Broadcasts>
    <Version>20020409</Version>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>ESPN-2002-0114</ProgramID>
      <Time>2002-04-09 15:00</Time>
      <Duration>130m</Duration>
      <Service>ESPN</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>KCET-2002-0115</ProgramID>
      <Time>2002-04-09 17:10</Time>
      <Duration>30m</Duration>
      <Service>KCET</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020408</Version>
      <ProgramID>CNN-2002-0394</ProgramID>
      <Time>2002-04-19 00:55</Time>
      <Duration>60m</Duration>
      <Service>CNN</Service>
    </Broadcast>
  </Broadcasts>
</Programs>
```

Fig.15

```
<?xml version="1.0" encoding="UTF-8" ?>
<Programs>
  <Version>20020407</Version>
  <Broadcasts>
  <Version>20020407</Version>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>ESPN-2002-0114</ProgramID>
      <Time>2002-04-09 15:00</Time>
      <Duration>130m</Duration>
      <Service>ESPN</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>KCET-2002-0115</ProgramID>
      <Time>2002-04-09 17:10</Time>
      <Duration>30m</Duration>
      <Service>KCET</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020408</Version>
      <ProgramID>CNN-2002-0394</ProgramID>
      <Time>2002-04-19 00:55</Time>
      <Duration>60m</Duration>
      <Service>CNN</Service>
    </Broadcast>
  </Broadcasts>
</Programs>
```

Fig.16

```
<?xml version="1.0" encoding="UTF-8" ?>
<Programs>
  <Version>20020409</Version>
  <Broadcasts>
    <Version>20020409</Version>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>ESPN-2002-0114</ProgramID>
      <Time>2002-04-09 15:00</Time>
      <Duration>130m</Duration>
      <Service>ESPN</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>KCET-2002-0115</ProgramID>
      <Time>2002-04-09 17:10</Time>
      <Duration>30m</Duration>
      <Service>KCET</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020408</Version>
      <ProgramID>CNN-2002-0394</ProgramID>
      <Time>2002-04-19 00:55</Time>
      <Duration>60m</Duration>
      <Service>CNN</Service>
    </Broadcast>
  </Broadcasts>
</Programs>
```

Fig.17

```
<?xml version="1.0" encoding="UTF-8"?>
<Invalid>
  <Programs>
    <Broadcast>
      <Version>20020110</Version>
      <ProgramID>CNN-2002-0394</ProgramID>
    </Broadcast>
  </Programs>
</Invalid>
<Programs>
  <Version>20020407</Version>
  <Broadcasts>
  <Version>20020407</Version>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>ESPN-2002-0114</ProgramID>
      <Time>2002-04-09 15:00</Time>
      <Duration>130m</Duration>
      <Service>ESPN</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>KCET-2002-0115</ProgramID>
      <Time>2002-04-09 17:10</Time>
      <Duration>30m</Duration>
      <Service>KCET</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020408</Version>
      <ProgramID>CNN-2002-0394</ProgramID>
      <Time>2002-04-19 00:55</Time>
      <Duration>60m</Duration>
      <Service>CNN</Service>
    </Broadcast>
  </Broadcasts>
</Programs>
```

Fig. 18

```
<?xml version="1.0" encoding="UTF-8"?>
<Invalid>
  <Programs>
    <Broadcast>
      <Version>20020110</Version>
      <ProgramID>CNN-2002-0394</ProgramID>
    </Broadcast>
  </Programs>
</Invalid>
<Programs>
  <Version>20020409</Version>
  <Broadcasts>
  <Version>20020409</Version>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>ESPN-2002-0114</ProgramID>
      <Time>2002-04-09 15:00</Time>
      <Duration>130m</Duration>
      <Service>ESPN</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020409</Version>
      <ProgramID>KCET-2002-0115</ProgramID>
      <Time>2002-04-09 17:10</Time>
      <Duration>30m</Duration>
      <Service>KCET</Service>
    </Broadcast>
    <Broadcast>
      <Version>20020408</Version>
      <ProgramID>CNN-2002-0394</ProgramID>
      <Time>2002-04-19 00:55</Time>
      <Duration>60m</Duration>
      <Service>CNN</Service>
    </Broadcast>
  </Broadcasts>
</Programs>
```

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2003/002349

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H04N 7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int. Cl. 7 G06F 17/21, G06F 15/173, G06F 17/27

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIASS "XML", ELECTRONIC", DOCUMENT", VERSION", UPDAT"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 02/063494 A2(KONINKLIJKE PHILIPS ELECTRONICS N.V.), 15 August 2002 -See the whole document	1-25
A	WO 02/27520 A1(EIZEL TECHNOLOGIES, INC.), 4 April 2002 -See the whole document	1-25
A	WO 01/55900 A1(XMLCITIES, INC.), 2 August 2001 -See the whole document	1-25

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☒ See patent family annex.

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11 FEBRUARY 2004 (11.02.2004)	11 FEBRUARY 2004 (11.02.2004)

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CHOI, Hoon

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR2003/002349

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 02/063494 A2	15 August 2002	CA 2397797 AA	26-07-2001
		AU 200127931 A5	31-07-2001
		EP 1254049 A1	06-11-2002
WO 02/27520 A1	4 April 2002	US 2002062325 AA	23-05-2002
		AU 200194884 A5	08-04-2002
		US 2002059367 AA	16-05-2002
		WO 200227516 C2	20-02-2003
		EP 1330723 A1	30-07-2003
		AU 200194881 A5	08-04-2002
		CA 2423695 AA	04-04-2002
		WO 200227520 C2	06-06-2002
		CA 243611 AA	04-04-2002
WO 01/55900 A1	2 August 2001	JP 2003521069 T2	08-07-2003
		US 2001032218 AA	18-10-2001
		US 2001032217 AA	18-10-2001
		WO 200155899 A1	02-08-2001
		AU 200126368 A5	07-08-2001
		AU 200127754 A5	07-08-2001
		CA 2365622 AA	02-08-2001
		CN 1392986 T	22-01-2003
		WO 200155900 C2	18-04-2002

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